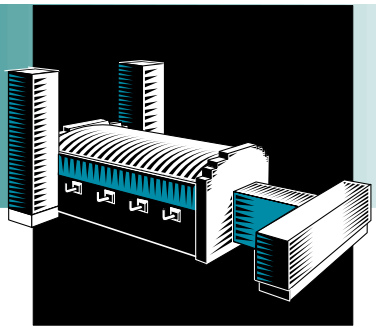
GLASS
Project Fact Sheet



Monitoring and Control of Alkali Volatilization and Batch Carryover for Minimization of Particulates and Crown Corrosion

Benefits

- Optimized use of raw materials
- Improved combustion efficiency
- Reduced particulate matter emissions
- Improved furnace efficiency
- Extended furnace life
- Intelligent control

Applications

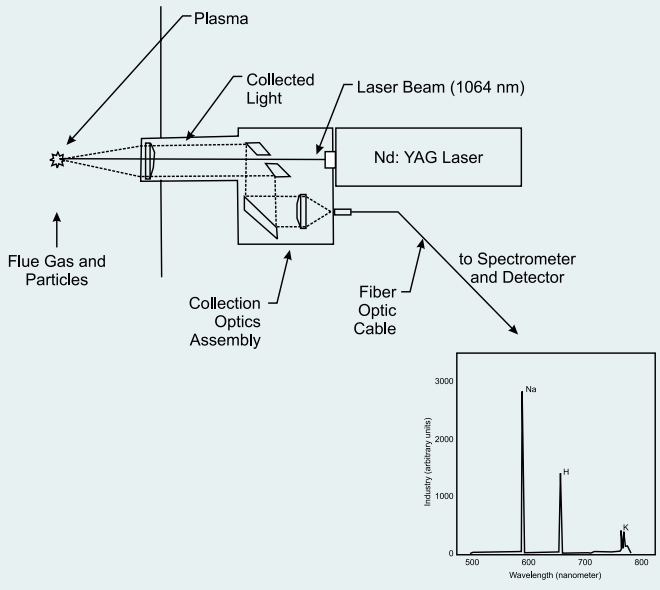
This project addresses energy efficiency, emissions, and corrosion issues associated with soda lime glass melting. The technology used in this project will help minimize the costs of producing containers, flat glass,

New Technology Will Allow Glass Manufacturers to Optimize Furnace Conditions

Laser-induced breakdown spectroscopy (LIBS) is a continuous monitoring technique that glass manufacturers can use to reduce particulate matter emissions and extend furnace life. By observing the correlation of metals concentrations with operating conditions over long periods of time, this new technique will identify batch properties and furnace conditions associated with batch carryover and alkali volatilization.

Because researchers expect the oxygen-to-fuel ratio to be among the significant process variables, the measurements will allow additional efficiency improvements. The technology will provide glass manufacturers with real-time access to data directly related to particulate matter emissions and rates of crown refractory corrosion, information that is inaccessible using the monitoring and control equipment currently in place.

Schematic Diagram of LIBS Instrument



By taking measurements in the flue gas of glass melting furnaces, the LIBS instrument helps reduce particulate emissions and extend furnace life.

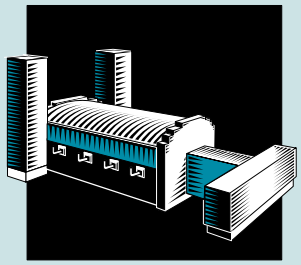
Project Description

Goal: Use laser-induced breakdown spectroscopy (LIBS) to reduce particulate matter emissions, increase furnace life, and improve furnace efficiency through simultaneous minimization of batch dust carryover, minimization of alkali volatilization, and optimization of oxygen-to-fuel ratio during glass melting and refining.

During the first two years of this three year project, researchers will collect data to determine the conditions having the greatest influence on high or low volatilization, batch carryover, combustion efficiency, and furnace efficiency. Researchers will also develop software for the control and acquisition of data from a broad-band LIBS instrument in the second year and design, build and test a prototype in the third year. Once the prototype has been tested, researchers will design a control strategy and system for minimizing alkali volatilization and batch carryover and maximizing furnace efficiency.

Progress and Milestones

- The project was awarded in late 2000.
- Researchers will collect data through extended measurement campaigns.
- A prototype of a low cost sodium and calcium monitor will be built and tested.
- Researchers will validate a strategy for minimizing volatilization and entrainment while maintaining high combustion and furnace efficiency.



Project Partners

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